



DM7544/DM8544 TRI-STATE® Quad Switch Debouncers

General Description

These circuits are for use in front panels, and similar applications where contact bounce must be eliminated. Within the single package, these circuits do the job of four R-S latches plus pull-up resistors. A strobe is also available which permits sampling of the switch information at a pre-determined time. TRI-STATE outputs are also provided for direct connections to the switch line bus.

Features

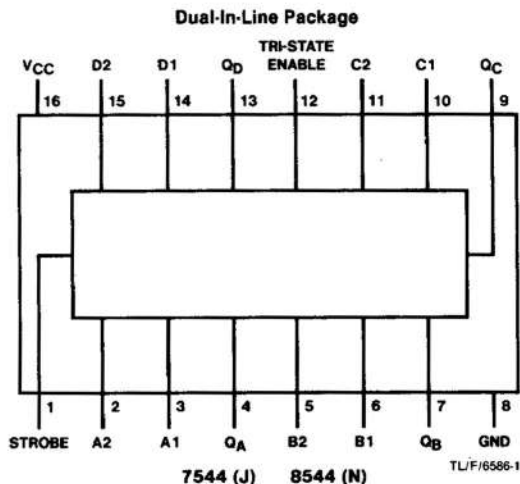
- Replaces SN54279/74279
- Eliminates push-button noise
- Allows clocked devices to be operated from switches
- Maximum power dissipation 250 mW
- Bus-line connectable
- TRI-STATE outputs
- Typical propagation delay 18 ns

Absolute Maximum Ratings (Note 1)

| | |
|---------------------------|----------------|
| Supply Voltage | 7V |
| Input Voltage | 5.5V |
| Storage Temperature Range | -65°C to 150°C |

Note 1: The "Absolute Maximum Ratings" are those values beyond which the safety of the device can not be guaranteed. The device should not be operated at these limits. The parametric values defined in the "Electrical Characteristics" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

Connection Diagram



Function Table

| A1 | A2 | TRI-STATE Enable | Strobe | Q _A (t) |
|----|----|------------------|----------------|----------------------|
| X | X | H | X | Hi-Z |
| X | X | L | L | Q _A (t-1) |
| L | L | L | \overline{L} | Indeterminate |
| L | H | L | H | L |
| H | L | L | H | H |
| H | H | L | H | Q _A (t) |

Recommended Operating Conditions

| Symbol | Parameter | DM7544 | | | DM8544 | | | Units |
|-----------------|--------------------------------|--------|-----|-----|--------|-----|------|-------|
| | | Min | Nom | Max | Min | Nom | Max | |
| V _{CC} | Supply Voltage | 4.5 | 5 | 5.5 | 4.75 | 5 | 5.25 | V |
| V _{IH} | High Level Input Voltage | 2 | | | 2 | | | V |
| V _{IL} | Low Level Input Voltage | | | 0.8 | | | 0.8 | V |
| I _{OH} | High Level Output Current | | | -2 | | | -5.2 | mA |
| I _{OL} | Low Level Output Current | | | 16 | | | 16 | mA |
| T _A | Free Air Operating Temperature | -55 | | 125 | 0 | | 70 | °C |

Electrical Characteristics

over recommended operating free air temperature (unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ (Note 1) | Max | Units |
|------------------|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------|-------|--------------|------|-------|
| V _I | Input Clamp Voltage | V _{CC} = Min, I _I = -12 mA | | | -1.5 | V |
| V _{OH} | High Level Output Voltage | V _{CC} = Min, I _{OH} = Max V _{IL} = Max, V _{IH} = Min | 2.4 | | | V |
| V _{OL} | Low Level Output Voltage | V _{CC} = Min, I _{OL} = Max V _{IH} = Min, V _{IL} = Max | | | 0.4 | V |
| I _I | Input Current @ Max Input Voltage | V _{CC} = Max, V _I = 5.5V | | | 1 | mA |
| I _{IH} | High Level Input Current | V _{CC} = Max, V _I = 2.4V | | | 40 | μA |
| I _{IL} | Low Level Input current | V _{CC} = Max V _I = 0.4V | Data | | -2.5 | mA |
| | | | Other | | -1.6 | |
| I _{OZH} | Off-State Output Current with High Level Output Voltage Applied | V _{CC} = Max, V _O = 2.4V V _{IH} = Min, V _{IL} = Max | | | 40 | μA |
| I _{OZL} | Off-State Output Current with Low Level Output Voltage Applied | V _{CC} = Max, V _O = 0.4V V _{IH} = Min, V _{IL} = Max | | | -40 | μA |
| I _{OS} | Short Circuit Output Current | V _{CC} = Max (Note 2) | DM75 | -18 | -55 | mA |
| | | | DM85 | -18 | -55 | |
| I _{CC} | Supply Current | V _{CC} = Max | | | 50 | mA |

Note 1: All typicals are at V_{CC} = 5V, T_A = 25°C.

Note 2: Not more than one output should be shorted at a time.

Switching Characteristics at $V_{CC} = 5V$ and $T_A = 25^\circ C$ (See Section 1 for Test Waveforms and Output Load)

| Parameter | From (Input) To (Output) | $R_L = 400\Omega$ | | | | | | Units |
|-----------------------------------------------------------------|--------------------------|---------------------|-----|-----|----------------------|-----|-----|-------|
| | | $C_L = 5\text{ pF}$ | | | $C_L = 50\text{ pF}$ | | | |
| | | Min | Typ | Max | Min | Typ | Max | |
| t_{PLH} Propagation Delay Time Low to High Level Output | Data to Output | | | | | 20 | 36 | ns |
| t_{PHL} Propagation Delay Time High to Low Level Output | Data to Output | | | | | 17 | 30 | ns |
| t_{PZH} Output Enable Time to High Level Output | Enable to Q | | | | | 15 | 25 | ns |
| t_{PZL} Output Enable Time to Low Level Output | Enable to Q | | | | | 12 | 24 | ns |
| t_{PHZ} Output Disable Time from High Level Output | Enable to Q | | 5 | 10 | | | | ns |
| t_{PLZ} Output Disable Time from Low Level Output | Enable to Q | | 10 | 20 | | | | ns |

Logic Diagram
